

FEMALES OF THE NEARCTIC *MOLANNA*  
(TRICHOPTERA: MOLANNIDAE)

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*Abstract.*—The female genitalia of the five nearctic species of *Molanna*, *M. ulmerina* Navas, *M. uniophila* Vorhies, *M. flavicornis* Banks, *M. blenda* Sibley, and *M. tryphena* Betten, are described with an emphasis on diagnostic characters. A key to the species is provided.

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In North America, the genus *Molanna* comprises five species; all are quite common and widely distributed in the eastern half of the continent, and one species, *M. flavicornis*, extends west into Colorado and British Columbia.

Good diagnostic characters have been found for the adult males (Ross, 1944) and the larvae (Sherberger and Wallace, 1971), but no attempt has yet been made to identify the females. The only illustration of the female genitalia is that of *M. tryphena* given by Betten and Mosely (1940), but it is too vague to be of any use.

The earliest described North American species of *Molanna*, *cinerea* Hagen, is not presently recognizable; the type is a female, and only fragments of its head and legs and a fairly complete set of wings remain (Ross, 1938). Because the diagnostic features we offer here are all based on the genitalia, the identity of *M. cinerea* must still remain in question.

During the preparation of a list of Québec Trichoptera (Roy and Harper, 1979), we have had the opportunity of examining large series of *Molanna* and we have found good characters for the identification of the females.

MATERIAL AND METHODS

The material examined (some 300 specimens preserved in alcohol) originated from scattered collecting in Québec, particularly from St. Hippolyte (in the Laurentian foothills), Lake St. Louis (on the St. Lawrence River), and James Bay Territory. Associations of males and females were established by considering only geographically or phenologically isolated series.

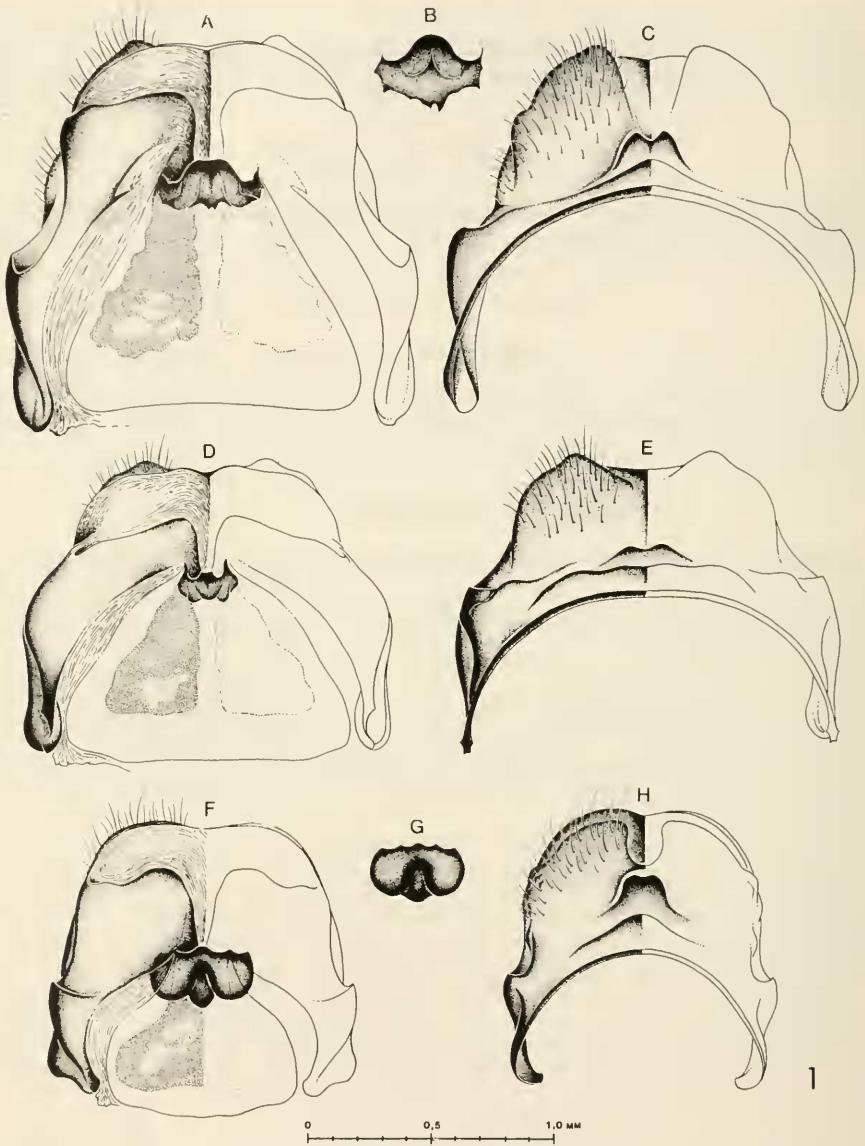


Fig. 1. External female genitalia. A. *Molanna ulmerina*, ventral. B. *M. uniophila*, subgenital plate. C. *M. ulmerina*, dorsal. D. *M. flavicornis*, ventral. E. *M. flavicornis*, dorsal. F. *M. blenda*, ventral. G. *M. tryphena*, subgenital plate. H. *M. blenda*, dorsal.

The abdomens were cut off, cleared in 10% KOH, washed in distilled water, and mounted in glycerin.

The interpretation of the external structures is based on Nielsen (1970, 1978) and that of the internal genital system on Unzicker (1968), Dugdale (1974), and Matsuda (1976). The descriptions are restricted to the genital segments since the species are very similar in other respects. Nonetheless sizes are given (as the length of the forewing) because two of the species, *M. blenda* and *M. tryphena*, are distinctly smaller than the other three; similar size differences have already been noted in the males and larvae (Ross, 1944; Sherberger and Wallace, 1971).

The measurements and the photographs were made respectively with a Wild Censor Automatic Micrometer and a Wild Photomicroscope M 400.

### THE FEMALE GENITAL SEGMENTS

The general appearance of the female genital segments is illustrated in Fig. 1. The eighth segment is the last abdominal segment distinctly possessing both a tergum and a sternum. Segments IX and X are fused to form a large sclerified tube enclosing the rectal and genital systems. Dorsally the boundary between the two segments is marked by a slight narrowing of the abdomen. In most species, a small projection arises mesally from the hind margin of the ninth tergum; this projection is either quadrate or subtriangular, and in the latter case, it bears a pair of fingerlike processes. The ninth sternum bears three plates: A broad median triangular plate which is flat or slightly depressed and carries large pigmented patches, and two lateroposterior plates flanking on the genital aperture; these lateral sclerites are connected to the median plate by a thick membrane. The hind margin of the sternum is more or less truncate with a wide and deep median cleft. The tenth segment forms a large dorsal hood which curves strongly downward at its apex; it bears distally two stout triangular projections which are slightly turned inward and are covered with fine bristles; between these projections, the tergum is depressed into a V- or U-shaped groove. Ventrally a wide membrane connects the ninth sternum to the hind margin of segment X.

The internal genital structures of taxonomic interest are (a) the vagina which is heavily sclerified and complex in its anterior half (=the vaginal plate, Figs. 2, 3), and (b) a very characteristic ventral sclerite fused at its apex to the hind margin of the median sternal plate of segment IX thus forming the lower lip of the genital aperture (=the subgenital plate, Fig. 1).

*Molanna ulmerina* Navas, 1934

Figs. 1A, 1C, 2A, 2B, 3A

Material examined.—94 specimens; St. Hippolyte, Lac Monroe (Parc du Mont Tremblant), La Ferme, Dégelis, Laes Atilla and Julie (James Bay Territory); 19.VI–4.IX.

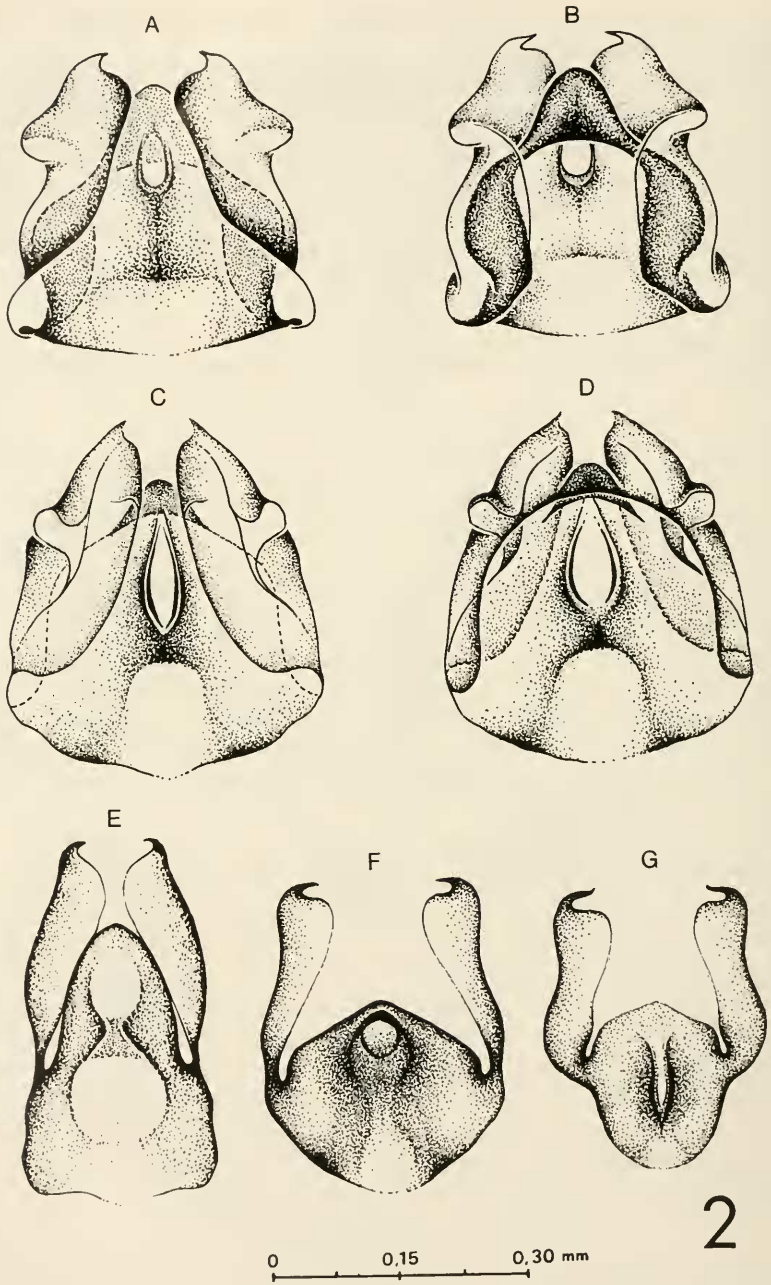


Fig. 2. Vaginal plate. A. *Molanna ulmerina*, ventral. B. *M. ulmerina*, dorsal. C. *M. uniophila*, ventral. D. *M. uniophila*, dorsal. E. *M. flavicornis*, ventral. F. *M. blenda*, ventral. G. *M. tryphena*, ventral.

Description.—Length of forewing 10.2–14.6 mm (mean 12.6 mm). Apex of abdomen slightly tapered. Unique diagnostic character is large tongue-shaped apex of median sternal plate which extends far beyond genital opening, its edge truncate or broadly rounded (Fig. 1A). Small median projection arising from posterior margin of 9th tergum bifurcate with 2 slender finger-like processes which are weakly divergent and variable in length (often short as in Fig. 1C). Apical triangular projections of 10th tergum robust, very well defined and their apex pointed; median groove large and V-shaped. Internal subgenital plate with broad quadrate body which extends posteriorly and bears 2 lateral winglike lobes, its anterior edge irregularly sculptured. Vagina, in its sclerified part, with a very sinuate profile and bearing 2 expanded posterior lobes; lateral margins constricted at 2 different levels, thus dividing vaginal plate into 3 almost equal parts (Figs. 2A, 2B, 3A); upper surface of vagina carries a deep subrectangular excision which is widely opened anteriorly and ends posteriorly in a nose-shaped process.

*Molanna uniophila* Vorhies, 1909

Figs. 1B, 2C, 2D, 3B

Material examined.—105 specimens; Lac St. Louis (St. Lawrence River); 2–18.VII.

Description.—Length of forewing 10.1–13.9 mm (mean 11.8 mm). External genital segments and subgenital plate (Fig. 1B) very similar to those of *M. ulmerina*. Vaginal plates distinctive; in both dorsal and ventral views, lateral margins more dilated and less sinuate in *M. uniophila*, and posterior lobes only weakly marked (Figs. 2C, 2D); also dorsal excision roughly U-shaped and widely opened.

*Molanna flavicornis* Banks, 1914

Figs. 1D, 1E, 2E, 3C

Material examined.—54 specimens; Lac St. Louis, Lac Mistassini, Poste-de-la-Baleine, Lacs Hélène et Julie (James Bay Territory); 18.VI–12.VII.

Description.—Length of forewing 10.2–14.0 mm (mean 12.6 mm). Apex of abdomen less elongate than in preceding species and sides of 9th segment deeply depressed. Median sclerite of sternum IX ends in a slightly recessed square tooth (Fig. 1D). Median dorsal projection of 9th tergum vestigial, being reduced to an indication of a bifurcate structure (Fig. 1E), or often missing altogether. Apical projections of 10th tergum very short and blunt, and depression between them shallow. Subgenital plate finely sculptured and weakly sclerified, having characteristically the outline of a bat with partially folded wings (Fig. 1D). Vaginal plate a very elongate structure with parallel sides and slightly sinuate margins; hind part bearing long slender lobes on each side of an ogival median projection; basal  $\frac{1}{2}$  almost flat and its anterior corners prominent (Figs. 2E, 3C).



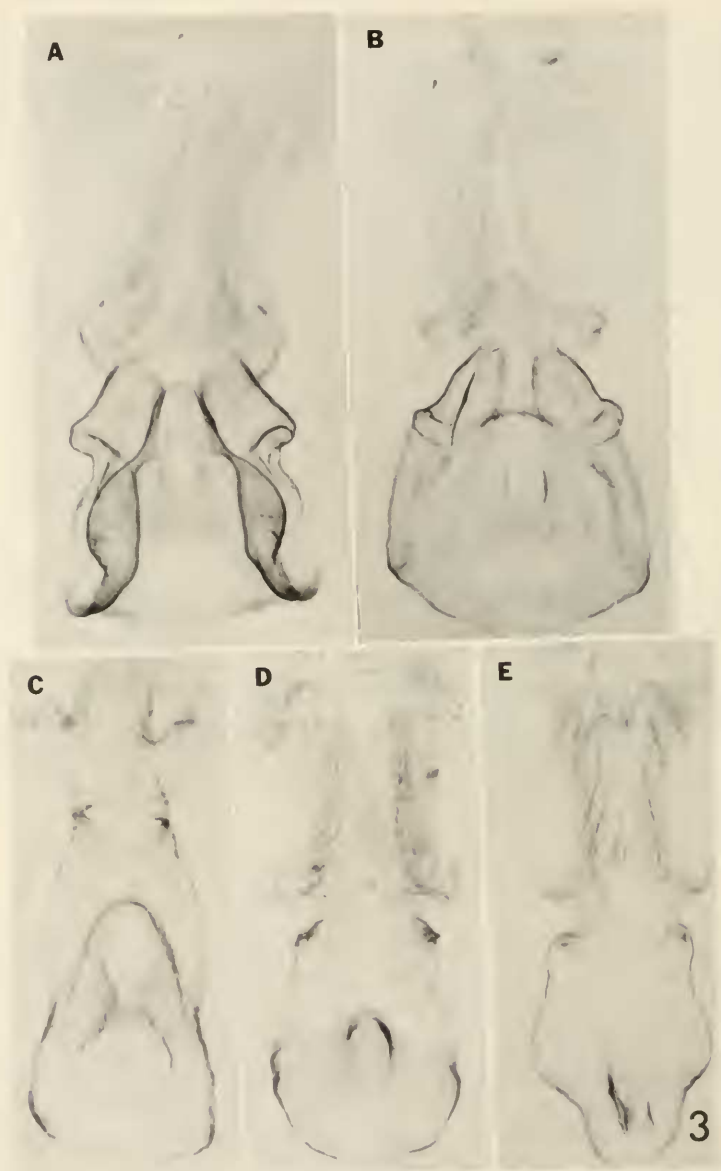


Fig. 3. Ventral view of the vagina. A. *Molanna ulmerina*. B. *M. uniophila*. C. *M. flavicornis*. D. *M. blenda*. E. *M. tryphena*.

*Molanna blenda* Sibley, 1926

Figs. 1F, 1H, 2F, 3D

Material examined.—69 specimens; St. Hippolyte: 11.VI–7.IX.

Description.—Length of forewing 7.4–10.2 mm (mean 8.7). Last abdominal segments with parallel sides; apex of abdomen broadly rounded. Median sternal plate of 9th sternum bears posteriorly a small rounded lobe which juts out very slightly (Fig. 1F). Median projection of 9th tergum large and quadrate; its apical margin straight or weakly incised (Fig. 1H). Apical projections of 10th tergum prominent; their apex sharp and turned inward; depression between them deep and U-shaped (Fig. 1H). Subgenital plate large and heavily sclerified; its outline like that of 2 circular lobes partially joined mesally, with a wedge-shaped process inserted between them (Fig. 1F). Vaginal plate similar to that of *M. flavicornis*, but shorter and anterior margin rounded; its posterior lobes thinner at their base and more widely separated.

*Molanna tryphena* Betten, 1934

Figs. 1G, 2G, 3E

Material examined.—7 specimens; St. Hippolyte: 12.VI–25.VII.

Description.—Length of forewing 7.8–9.0 mm (mean 8.6 mm). In most respects resembling *M. blenda*; however, anterior ½ of vaginal plate abruptly tapered into a quadrate apical lobe instead of being dilated and rounded and aperture of spermathecal duct also very narrow and elongate (Figs. 2G, 3E).

KEY TO FEMALES OF *MOLANNA*

1. Projection of hind margin of tergum IX well developed (Fig. 1C); apex of median plate of sternum IX produced into a rounded lobe (Fig. 1A) ..... 2
  - Projection of hind margin of tergum IX absent or vestigial (Fig. 1E); apex of median plate of sternum IX produced into a small quadrate tooth (Fig. 1D); subgenital plate as in Fig. 1D ... *M. flavicornis* Banks
2. Projection of 9th tergum subtriangular, bearing a pair of digitate processes (Fig. 1C); apex of median plate of sternum IX produced into a large tongue-like lobe which projects far beyond the genital opening (Fig. 1A); subgenital plate as in Figs. 1A, 1B ..... 3
  - Projection of 9th tergum quadrate, its apical margin straight or slightly notched (Fig. 1H); apex of median plate produced into a small rounded lobe (Fig. 1F); subgenital plate as in Figs. 1F, 1G ..... 4
3. Vaginal plate with sinuate lateral margins and prominent posterior lobes (Figs. 2A, 2B, 3A); excision of the upper surface subrectangular (Fig. 2B) ..... *M. ulmerina* Navas

- Vaginal plate with only slightly curved margins and without prominent posterior lobes (Figs. 2C, 2D, 3B); excision of the upper surface widely opened and U-shaped (Fig. 2D) . . . . . *M. uniophila* Vorhies
- 4. Anterior ½ of vaginal plate tapering abruptly; aperture of spermathecal duct elongate (Figs. 2G, 3E) . . . . . *M. tryphena* Betten
- Anterior ½ of vaginal plate large and rounded, not tapering; aperture of spermathecal duct circular (Figs. 2F, 3D) . . . . . *M. blenda* Sibley

#### ACKNOWLEDGMENTS

This study was supported by grants from the Natural Sciences and Engineering Research Council of Canada and the Québec Department of Education. We thank Ms. Louise Pelletier for her help with the photographs.

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